Installation instructions

Danfoss heat pump

DHP-R Eco

VMIFI102

Danfoss A/S is not liable or bound by warranty if these instructions are not adhered to during installation or service.

The English language is used for the original instructions.
Other languages are a translation of the original instructions.
(Directive 2006/42/EC)

© Copyright Danfoss A/S

Table of contents

DHP-R Eco

1 Important information 5
1.1 Refrigerant 5
1.2 Noise and vibrations 5
1.3 Electrical connection 6

2 Heat pump information 7
2.1 Components 7
2.2 Pipe connections 8
2.3 Required service space 8

3 Drilling holes for brine pipes 9

4 Unpacking and installation 9
4.1 Removing the front cover 9

5 Piping installation 10
5.1 Safety valve 10
5.2 Heating system supply pipe and return pipe 10

6 Electrical Installation 11
6.1 Electrical connection 11
6.2 Connecting pump hot gas 11
6.3 Connecting sensor for outside temperature 11
6.4 Connecting hot water sensor 12
6.5 Connecting sensor for system supply temperature 12
6.6 Connecting external start brine pump (passive cooling option) 12
6.7 Connecting exchange valve for hot water 12
6.8 Connecting room sensor (option) 12
6.9 Connecting pressure and/or flow switch (option) 12
6.10 Connecting start/stop auxiliary heater 12
6.11 Connecting external buzzer 12
6.12 Connecting system pump 12
6.13 Connecting control signal for auxiliary heater 12
6.14 Locations of the switches 13
6.15 Conversion table for sensors 13

7 Brine installation 13
7.1 Brine pipes and expansion tank 13
7.2 Filling the coolant system 13

8 Start up 14
8.1 Installing the front cover 14

9 Handover 15
9.1 Installation and commissioning carried out by: 15

10 Troubleshooting 16

11 Technical data 17

1 Important information

⚠ This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Cleaning and user maintenance shall not be made by children without supervision.

⚠ Children should be supervised to ensure that they do not play with the appliance.

⚠ The installation must only be carried out by an authorized installer with reference to applicable rules and orders and these installation instructions.

⚠ This apparatus is not intended for persons (including children) with reduced physical, sensory or psychological capacity, or who do not have knowledge or experience, unless supervised or they have received instructions on how the apparatus functions from a safety qualified person.

⚠ The heat pump must be located in a frost-free environment!

⚠ The floor must be able to support the gross weight of the heating installation.

⚠ The heating installation must be placed on a stable surface.

⚠ Before the heat pump is supplied with voltage you must ensure that the heating system and coolant system. incl. the heat pump. are filled and bled of air otherwise the circulation pumps can be damaged.

⚠ If the electrician wishes to test his connections before the above is carried out this should only done when it has been checked that the heat transfer fluid and coolant pumps have been disconnected.

⚠ When filling the coolant system the coolant pump must be operating but one must ensure that the compressor and the heat transfer pump cannot start. The coolant pump can then be run manually using a separate switch which is located on the electrical cabinet.

⚠ When filling is complete the coolant pump must be put in Auto mode.

⚠ The appliance is intended to be used by expert or trained users in shops, in light industry and on farms or commercial use by lay persons

⚠ Only spare parts approved by us may be used in this appliance.

⚠ The power supply must be disconnected during service and before changing parts in the appliance.

1 .1 Refrigerant

The heat pump's cooling system (refrigerant circuit) is filled with R407C or R134a (depending on version) refrigerant.

Work on the refrigerant circuit must only be carried out by a certified engineer!

Toxicity

In normal use and normal conditions the refrigerant has low toxicity. However. although the toxicity of the refrigerant is low. it can cause injury (or be highly dangerous) in abnormal circumstances or where deliberately abused. The refrigerant vapour is many times heavier than air and in enclosed spaces. below the level of the door for example. and in the event of leakage. large concentrations can occur with the risk of suffocation because of lack of oxygen. Spaces in which heavy vapour can collect below the level of the air must therefore be well ventilated.

Refrigerant exposed to a naked flame creates a poisonous irritating gas. This gas can be detected by its odour even at concentrations below its permitted levels. Evacuate the area until it has been sufficiently ventilated.

Anyone with symptoms of poisoning from the vapour must immediately move or be moved into the fresh air.

Work on the refrigerant circuit

When repairing the refrigerant circuit. the refrigerant must not be released from the heat pump – it must be destroyed at a special plant. Draining and refilling must only be carried out using new refrigerant (for the amount of refrigerant see manufacturer's plate) through the service valves. All warranties from Danfoss Heat Pump´s AB are void if. when filling with refrigerant other than R407C or R134a. it has not been notified in writing that the new refrigerant is an approved replacement refrigerant together with other remedies.

Scrapping

When the heat pump is to be scrapped the refrigerant must be extracted for destruction. The local regulations for treatment of refrigerant must be followed. See the relevant Swedish Environmental Protection Agency refrigerant statutes.

1 .2 Noise and vibrations

From the sound and vibration point of view it is important that the pipe mountings in the ceiling and walls are made with vibration damping fastenings and that the holes for lead-ins in the walls are made as large as possible so that sound and vibration do not spread.

If the house has poor acoustics. special care must be taken so that the vibrations do not spread into the building.

In such cases no mountings may be made in the house near the heat pump. All mountings must be in free standing constructions. which themselves are in vibration damping material such as Solodyn.

In those cases where the coolant side must be mounted to the building. flexible hoses should be used. although not the same type as the heat transfer pipes. Flexible hoses for the heat transfer and hot gas must be extra long (600 mm or longer) and connected at 90°. If one suspects that the floor on which the heat pump is located may transfer vibration to the rest of the building. the heat pump must be positioned on Solodyn pads. These pads must be weight adapted. Always consult the representative from Danfoss Heat pump´s AB in these cases.

1.3 Electrical connection

⚠ The electrical installation must only be carried out by an authorized electrician (and must follow applicable local and national regulations). The electrical installation must be carried out using permanently routed cables. It must be possible to isolate the power supply using an all-pole circuit breaker for the intended current. For information regarding maximum load for externally connected devices, see electrical installation instructions.

NOTE! The supplied language specific decal for electrical connection must be adhered to the inside of the door

Electrical current!

⚠ The terminal blocks are live and can be highly dangerous due to the risk of electric shock. The power supply must be isolated before electrical installation is started. The heat pump is internally connected at the factory.

Important information

⚠ 24 VAC 1 must not be connected together with:

- 24 VAC 2
- 24 VDC
- Other equipment that uses 0-10V control signal
- Signal ground GND

⚠ 24 VAC 2 must only be used as power supply to:

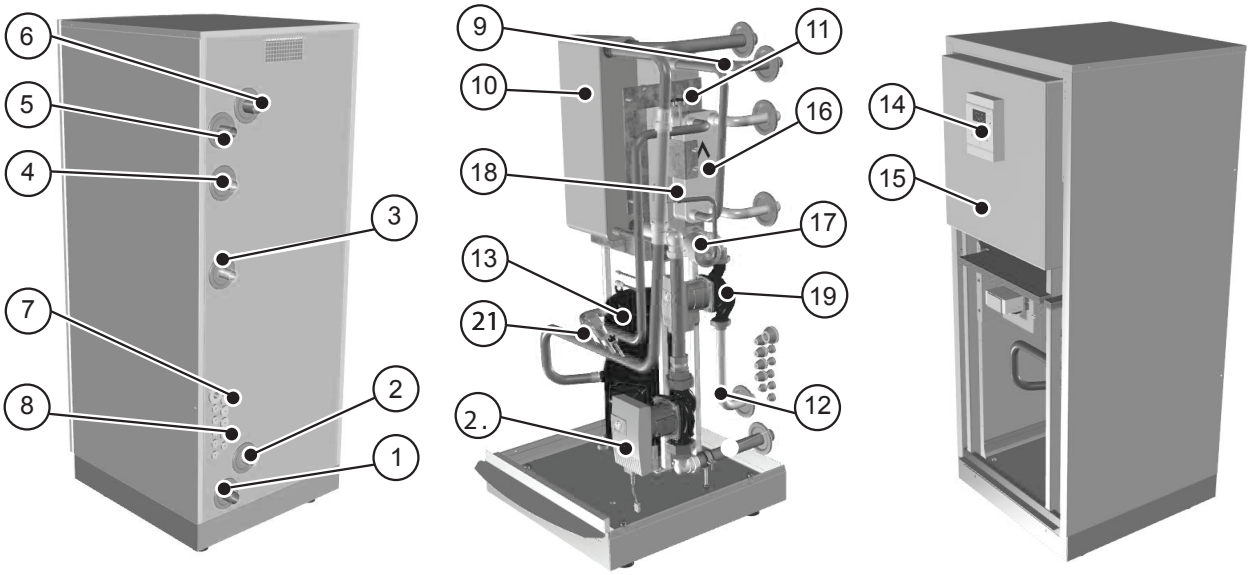
- External equipment that requires 0-10V control signal
- Auxiliary modules

⚠ The two separate 24 VAC circuits must never be connected to each other or to protective ground.

⚠ The total power load on 24 VAC 1 respectively 24 VAC 2 must not exceed 50VA.

2 Heat pump information

2.1 Components



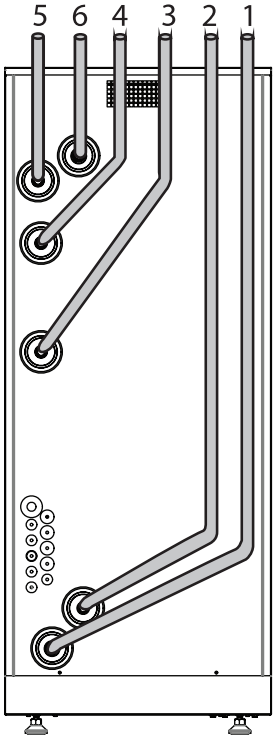
1 Coolant out (from HP)
2 Heat return (return line)
3 Return line hot-gas exchanger
4 Supply line hot-gas exchanger
5 Heat supply (supply line)
6 Coolant in (to HP)
7 Lead-in for communication cable
8 Lead-in for incoming supply and sensor
9 Supply pipe sensor
10 Condenser
11 Evaporator
12 Return sensor
13 Compressor
14 Instrument panel
15 Electrical cabinet
16 De-superheater
17 Drying filter
18 Expansion valve
19 Condenser circulation pump
20 Coolant pump
21 Low pressure transmitter

2.2 Pipe connections

	Connection diameter		
	Brine	Heat	De-superheater
DHP-R Eco 22	35	28	28
DHP-R Eco 26	35	28	28
DHP-R Eco 33	42	35	28
DHP-R Eco 42	42	35	28

When installing in confined spaces, pipe routing on the rear of the heat pump can be facilitated by connecting the pipes before the pump is put in position. See the figure below for an example on how the pipes can be routed.

⚠ NOTE! Remember not to tighten the pipes in the heat pump's panel casing as this transfers vibrations causing noise problems.

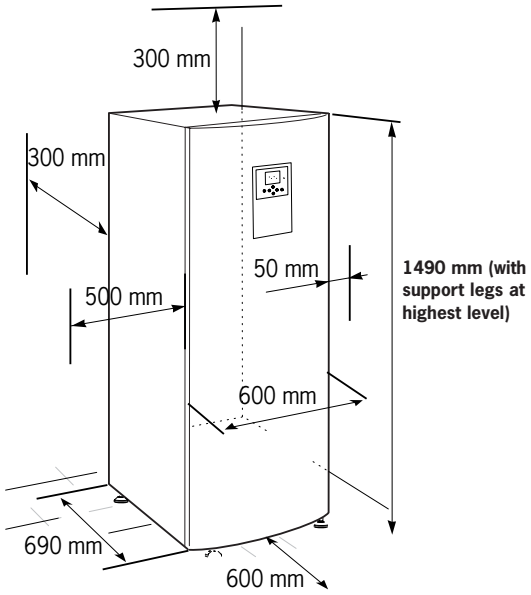


1. Coolant out (from HP)
2. Heat return (return line)
3. Return line hot-gas exchanger
4. Supply line hot-gas exchanger
5. Heat supply (supply line)
6. Coolant in (to HP)

2.3 Required service space

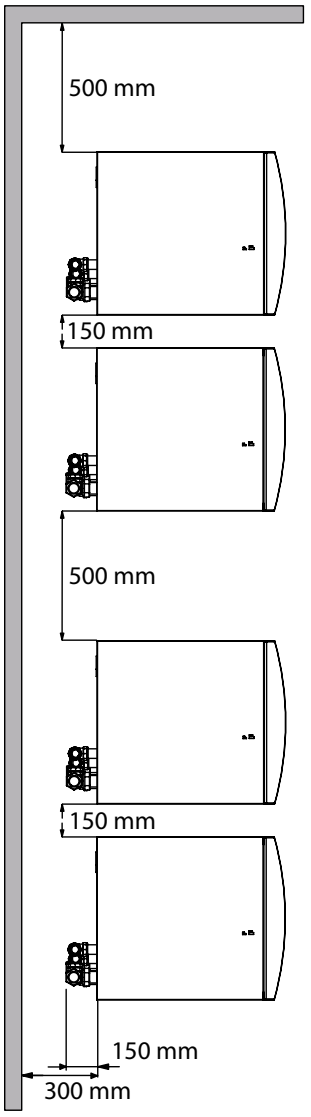
To facilitate installation and later tests and maintenance there must be sufficient free space around the heat pump according to the following dimensions:

When installing several heat pumps, the dimensions behind the heat pumps may need to be increased if there is not enough side space. The pumps must be set-up so that the installation can be accessed from behind.



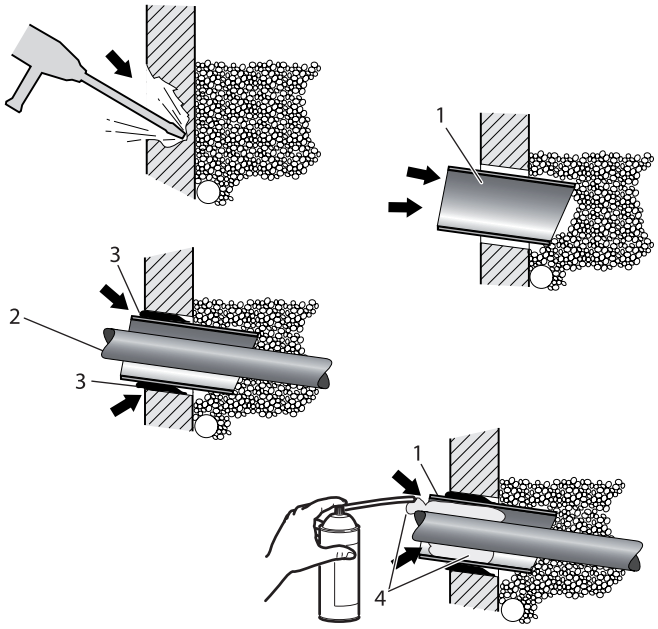
The figure above shows dimensions for one (1) installed heat pump and the necessary service space.

Required service space when installing several heat pumps in a row.



3 Drilling holes for brine pipes

- Make holes in the walls for the entry pipes (1) for the coolant pipes. Follow the dimensions and connection diagrams on pages 7-8.
- The output and input coolant pipes must have wall lead-ins.
- If there is a risk of infiltration by ground water, special lead-ins must be used.
- Install the entry pipes (1) so that they incline slightly downwards. The incline should be at least 1 cm per 30 cm. Cut them at an angle (as illustrated) so that rain water cannot get into the pipes.
- Ensure that the entry pipes are at the correct distance so that there is room for the other installations.
- Insert the brine pipes (2) into the insert pipes in the installation room.
- Fill in the holes in the wall with mortar (3).
- Ensure that the brine pipes (2) are centred in the insert pipes (1) so that the insulation is distributed equally on all sides.
- Seal the insert pipes (1) with a suitable sealant (foam) (4).



4 Unpacking and installation

The heat pump is packed in boxes and wrapped in cardboard and delivered on a wood pallet.

- Check that the delivery is complete and undamaged.

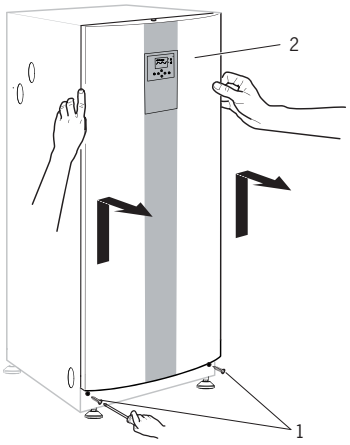
⚠ NOTE! When moving the heat pump, do not use the protruding pipe connections to lift the heat pump. The packaging should not be used to lift the heat pump either.

- Move the heat pump to the installation site.
- Cut off the straps and remove the packaging.
- Lift the heat pump from the pallet.
- Install a condensation drain if required.
- Adjust using the adjustable legs (5) so that it stands upright and level on the floor.

4.1 Removing the front cover

Remove the front cover plate as follows:

- Unscrew the screws (1).
- Slide the front cover (2) upwards and carefully lift it off upwards and forwards.
- Place the front cover next to the heat pump.



5 Piping installation

⚠ To prevent leaks ensure that there are no stresses in the connecting pipes!

- Ensure that the pipe installation is carried out in accordance with the dimensions and connection diagrams.
- **Pipe installation must be carried out by an authorized installer.**

⚠ NOTE! It is extremely important that the heating system is completely bled.

⚠ NOTE! Bleed valves must be installed where necessary.

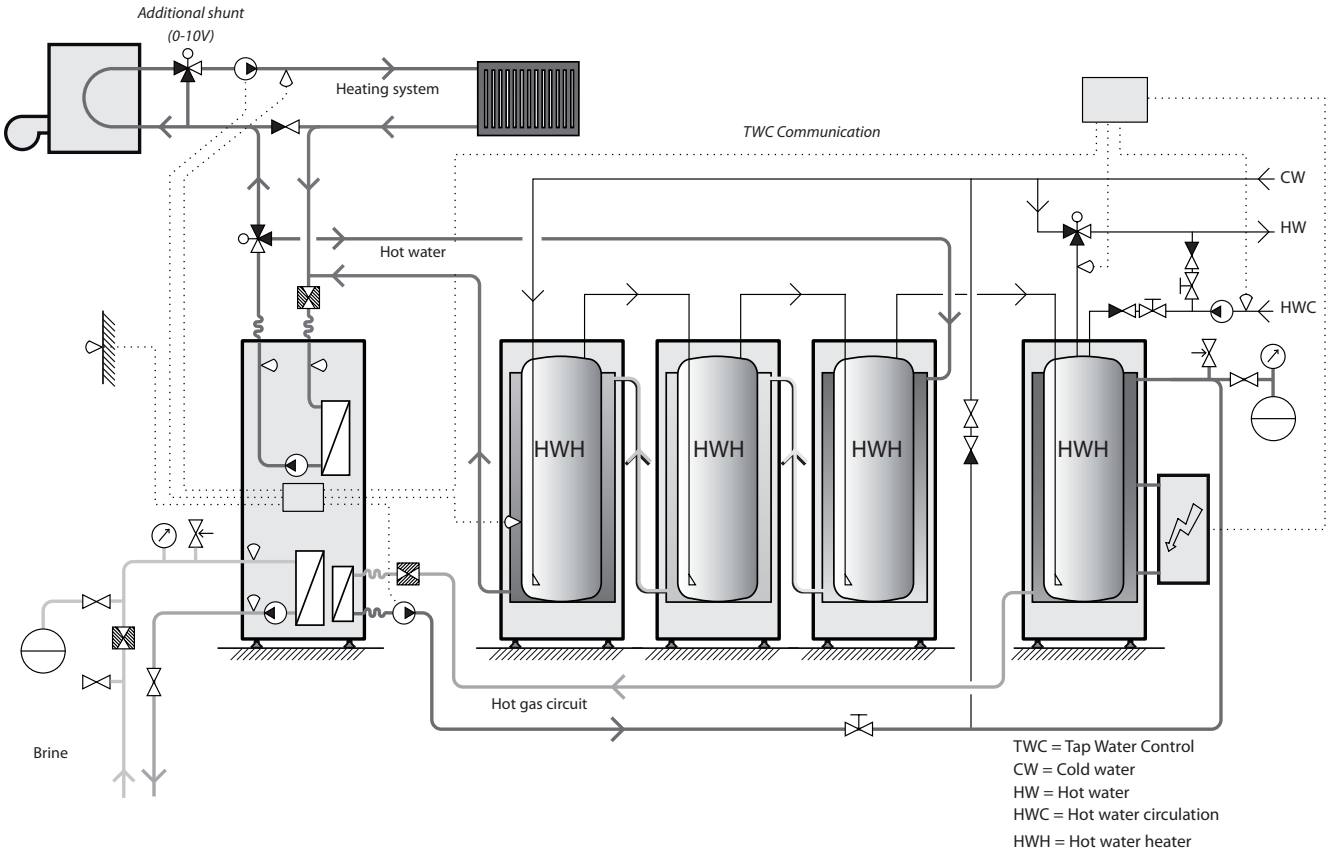
5.1 Safety valve

Radiator systems with closed expansion tanks must also be supplied with approved pressure gauge and safety valve.

⚠ NOTE! The heat pump must be connected to the expansion tank and the safety valve according to applicable regulations.
The connecting lines between the reservoir and the safety valve must be routed in a continuous incline. A continuous upwards slope means that the pipe must not slope downwards from the horizontal at any point.

5.2 Heating system supply pipe and return pipe

- Install a filter (max mesh size 0.7 mm) in the heating system's return pipe to protect the unit against foreign particles.
- Install the supply line with all the accompanying components.
- Install a suitable circulation pump in the heating system supply pipe and connect the pump's control cable to the relevant terminal block (see separate wiring diagram).
- Install the return line with all the accompanying components.
- Insulate the supply and return pipes.



Example of system solution for DHP-R Eco with several water heaters.

6 Electrical Installation

6.1 Electrical connection

⚠ The electrical installation must only be carried out by an authorized electrician (and must follow applicable local and national regulations). The electrical installation must be carried out using permanently routed cables. It must be possible to isolate the power supply using an all-pole circuit breaker for the intended current. For information regarding maximum load for externally connected devices. see electrical installation instructions.

Electrical current!

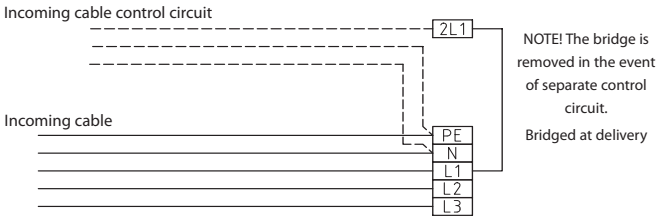
⚠ The terminal blocks are live and can be highly dangerous due to the risk of electric shock. The power supply must be isolated before electrical installation is started. The heat pump is internally connected at the factory. The electrical installation therefore mainly covers the following points:

Connection to the power supply

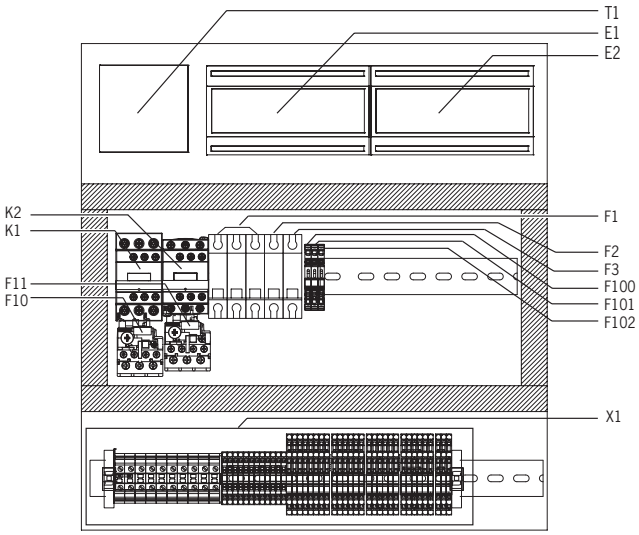
- Remove the front cover from the heat pump.
- Pull the power supply cable through the opening in the rear of the heat pump to the terminal blocks.
- Connect the supply cable to the designated terminal block.

See separate manual for the control system.

⚠ Note that the power supply cable must only be connected to the intended terminal block. No other terminal blocks may be used!

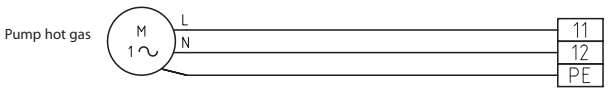


Electrical cabinet layout



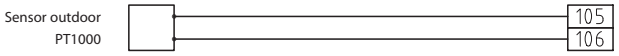
K1 Contactor compressor
K2 Contactor brine pump
F10 Over current relay compressor.
F11 Over current relay brine pump
F1 Fuse brine pump
F2 Control fuse regulation. overheating protection compressor
F3 Control fuse condensation pump
F100 Fuse 24 VAC 1
F101 Fuse 24 VDC
F102 Fuse 24 VAC 2
X1 Terminal blocks for incoming supply and temperature sensor as well as terminal blocks for external components
T1 Transformer 24 VAC 2x50 VA
E1 WM HPC
E2 HPC RM

6.2 Connecting pump hot gas



Connect the hot gas pump to the designated terminal block. The voltage is 230 VAC. The pump is designed to be placed outside the heat pump casing and must be connected with flexible hoses.
This pump runs in parallel with the compressor.

6.3 Connecting sensor for outside temperature



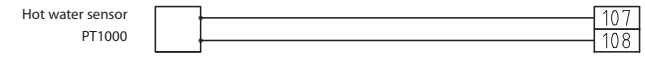
Position the outdoor sensor on the north or north west facing side of the house. away from direct sunlight. The outdoor sensor should not be placed on reflective panel walls. The sensor must be positioned at least 1 m from openings in the walls that emit hot air.
If the sensor cable is connected through a pipe. the pipe must be sealed so that the sensor is not affected by outgoing indoor air.

- Remove the rear piece from the heat pump.
- Route the outdoor sensor's connecting cable through the opening in the rear of the heat pump up to the connecting block.
- Connect the sensor to the designated terminal block. See separate manual for the control system.

⚠ Note that the outdoor sensor is connected with extra low protection voltage.

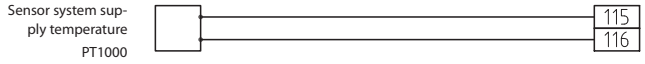
Also follow the applicable installation instructions for outdoor sensors!

6.4 Connecting hot water sensor



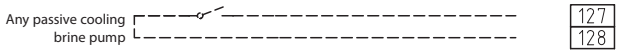
Connect the hot water sensor to the designated terminal block. The sensor should be positioned a third way up from the bottom in the water heater which is supplied with incoming cold water.
See separate manual for the control system.

6.5 Connecting sensor for system supply temperature



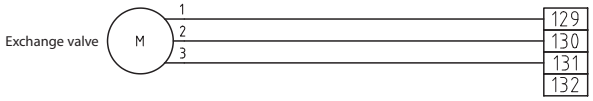
The system supply sensor must always be installed on the system's supply pipe after the auxiliary heater. The sensor must be positioned so that the heated water has been able to mix properly.
See separate manual for the control system.

6.6 Connecting external start brine pump (passive cooling option)



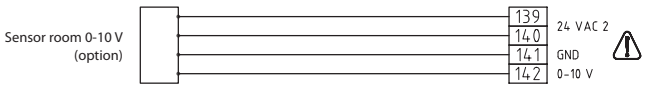
Potential free connection between terminal blocks 127-128 that start the brine pump. This function can be used for passive cooling from the brine circuit. Connect to the incoming brine pipe.
See separate manual for the control system.

6.7 Connecting exchange valve for hot water



See separate manual for the control system.

6.8 Connecting room sensor (option)



- Remove the front cover from the heat pump.
- Route the room sensor's connecting cable through the opening in the rear piece up to the connecting block.
- Connect the sensor to the designated terminal block. See separate manual for the control system.

⚠ Note that the room sensor's connecting voltage is extra low protection voltage. Also note that this is an active sensor supplied with 24 VAC.

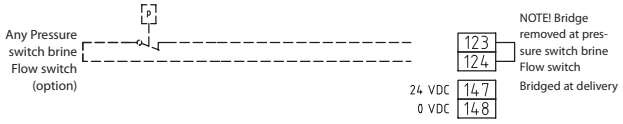
⚠ 24 VAC 1 must not be connected together with:
- 24 VAC 2
- 24 VDC
- Other equipment that uses 0-10V control signal
- Signal ground GND

⚠ 24 VAC 2 must only be used as power supply to:
- External equipment that requires 0-10V control signal
- Auxiliary modules

⚠ The two separate 24 VAC circuits must never be connected to each other or to protective ground.

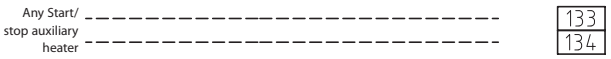
⚠ The total power load on 24 VAC 1 respectively 24 VAC 2 must not exceed 50VA.

6.9 Connecting pressure and/or flow switch (option)



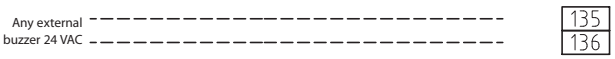
Connect the pressure and/or flow switch for the brine side to the intended terminal block 123-124 at the same time as removing the bridge. When using both the pressure and flow switch. these must be connected in series.
See separate manual for the control system.

6.10 Connecting start/stop auxiliary heater



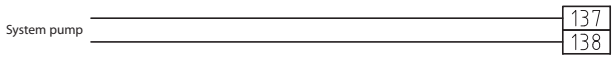
Start/stop auxiliary heating connected to terminal block 133-134 (24 VAC)
See separate manual for the control system.

6.11 Connecting external buzzer



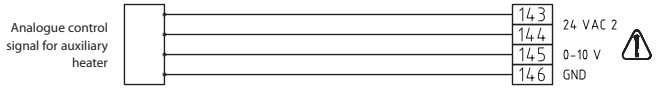
Active alarm produces 24 VAC out on terminal block 135-136.
See separate manual for the control system.

6.12 Connecting system pump



Start/stop of the house system pump 24 VAC.
See separate manual for the control system.

6.13 Connecting control signal for auxiliary heater



See separate manual for the control system.

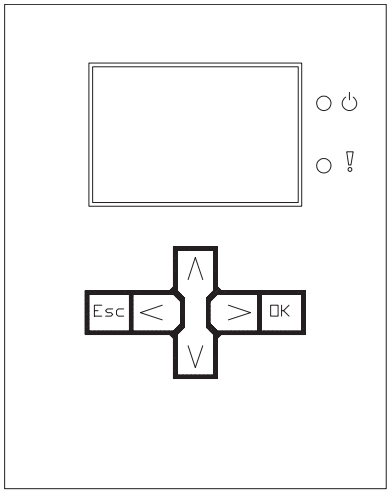
⚠ 24 VAC 1 must not be connected together with:
- 24 VAC 2
- 24 VDC
- Other equipment that uses 0-10V control signal
- Signal ground GND

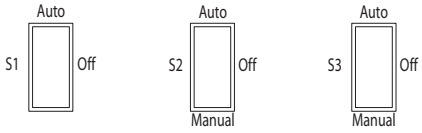
⚠ 24 VAC 2 must only be used as power supply to:
- External equipment that requires 0-10V control signal
- Auxiliary modules

⚠ The two separate 24 VAC circuits must never be connected to each other or to protective ground.

⚠ The total power load on 24 VAC 1 respectively 24 VAC 2 must not exceed 50VA.

6.14 Locations of the switches





S1 Switch compressor. (Auto/Off)

S2 Switch coolant pump. (Auto/Off/Manual)
NOTE! Must only be used in manual position when filling the system or other maintenance/service work.

S3 Switch circulation pump. (Auto/Off/Manual)

6.15 Conversion table for sensors

°C	ohm
-30	882
-20	921
-10	960
0	1000
10	1039
20	1078
30	1117
40	1155
50	1194
60	1232
70	1270
80	1309
90	1347
100	1385
110	1422
120	1460
130	1497

When reading the resistance of the sensors, the sensor leads must first be disconnected from the control equipment.
First measure the sensor including the cable.
Then measure the sensor only.

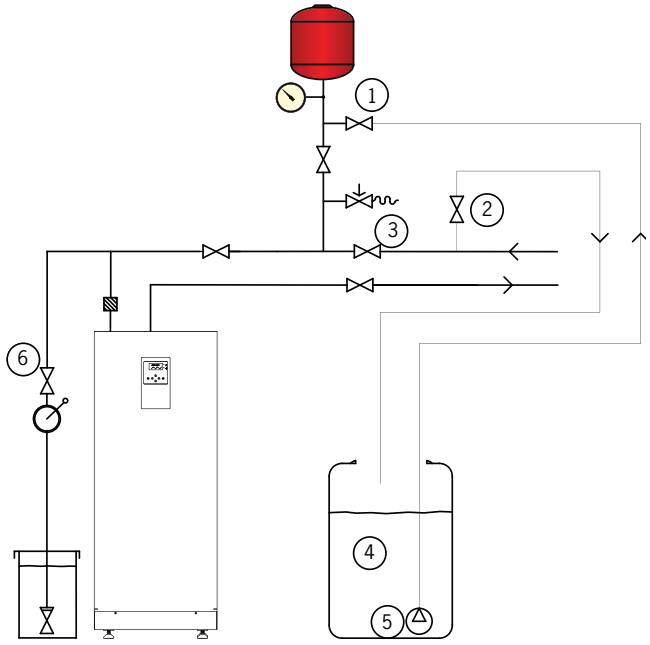
7 Brine installation

7.1 Brine pipes and expansion tank

- Install a filter (max mesh size 0.7 mm) in the input coolant pipe to protect the unit against foreign particles.
- Install the input coolant pipe with all the accompanying components.
- Install the output coolant pipe with all the accompanying components.
- Supply both the pipes with diffusion sealed condensation insulation.
- The expansion vessel for the coolant is sized according to the manufacturer's instructions.
- Max operating pressure heat source (see manufacturer's plate). Max 6 bar.

7.2 Filling the coolant system

⚠ WARNING! Ethylene glycol and ethanol must be handled according to the instructions on the packaging!



1 Connect the hose from the filler pump to valve 1.

2 Connect the return hose to valve 2.

3 Close valve 3.

4 Open valves 1 and 2.

5 Mix coolant in container 4.

6 Ensure that the heat pump is not powered.

7 Start filling pump 5.

8 When the coolant flows out of the return hose the internal coolant pump is bled inside the heat pump.

9 Set switch marked S1 in position Off. (Compressor Auto/Off)

10 Switch on the heat pump's safety switch.

11 Set switch marked S2 in position Manual. (Brine pump Auto/Off/Manual)

12 Then let both the pumps operate until there is no air mixture left in the circuit.

13 Stop both the pumps and immediately close valve 1 and 2.

14 Open valve 3 and disconnect the filling hoses.

15 Open valve 6 and pressurise the system, and vent via valve 1. Pressurise to max 1.5 bar.

16 Close valve 6.

17 Set switch S1 and S2 to Auto (compressor and brine pump).

18 Clean the strainers after filling.

8 Start up

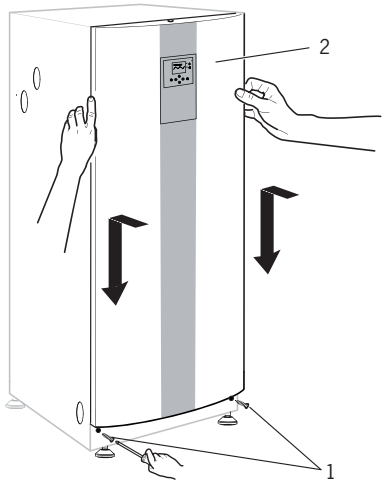
⚠ The installation may only start operation if the heating system, any hot water tanks and the coolant circuit are filled. Otherwise the pumps can be damaged.

In addition, the following points must be checked before starting operations:

- Check the rotation direction of the coolant pump. This is most easily done by setting switch S2 to manual. There is an indicator lamp, under the cover of the coolant pump connection terminal box, which lights when the rotation direction is correct.
- Check that all connections are sealed.
- Check the compressor's direction of rotation by starting the compressor and feel by hand if the pressure line (upper pipe) is warm and the suction line (lower pipe) is cold.
- If this is not the case, two of the phases in the power supply must be switched (for example L1 and L3).
- Adapt the factory settings to the customer requirements.

8.1 Installing the front cover

⚠ Take care not to damage the front cover!



Install the front cover as follows:

- Align the upper section of the front cover (2) in both the side channels on the unit and slide it carefully downwards until it covers the entire front side.
- Tighten the screws (1).

9 Handover

9.1 Installation and commissioning carried out by:

As user please ensure that the installer fills in the following information to facilitate servicing.

PIPE INSTALLATION

Date ..... Company .....

Name ..... Tel. No. .....

ELECTRICAL INSTALLATION

Date ..... Company .....

Name ..... Tel. No. .....

SYSTEM ADJUSTMENT

Date ..... Company .....

Name ..... Tel. No. .....

10 Troubleshooting

Alarm
In the event of an error message try restarting the installation using the reset button on the control panel. If restarting the heat pump does not help try rectifying the problem using the table below.

Message	Meaning	Cause	Remedy
LOW PRESS ERROR	Low pressure error - The compressor stops and there is no hot water production.	Not enough anti-freeze in the coolant system. Air in the brine system. Blocked filter in the brine system.	Fill the refrigerant with the correct percentage of anti-freeze and bleed using the safety valve on the volume container. Check if the strainer needs cleaning.
		Coolant pump has stopped or is running at slow speed.	Take temperature difference readings between incoming and outgoing coolant. The difference should be between approximately 3-5°C.
		Ice build up in the coolant system.	Measure the amount of anti-freeze in %, wait until the ice melts, which affects the low pressure switch not contacting the wiring.
		Underfilled cooling system or any leaks.	Drain and leak trace as well as filling new refrigerant. No refilling of drained medium.
		Blocked or filled drying filter in the cooling circuit.	Measure the temperature difference of the filter – max 2°C.
HIGH PRESS ERROR	High pressure error - The compressor stops and there is no hot water production.	Insufficiently opened radiator/ floor loop thermostats. Air in the heating system. Blocked strainer in the heating system, located in the heat pump return.	Open radiator / floor loop thermostats. Fill and bleed the heating system. Measure delta over the heat pump supply and return lines. Temperature difference.
		Overfilled refrigerant circuit.	Draining the refrigerant circuit and refilling with new refrigerant, according to the instructions.
		Heat transfer fluid pump has stopped or is running at slow speed.	Check the heart transfer fluid pump.
MOTOR P ERROR	Motor protection error - (Over current relay compressor or brine pump). The compressor stops and there is no hot water production.	Phase drop or blown fuse.	Check the fuses and cable terminals (power supply to the compressor or brine pump).
		Poorly tightened electrical connections.	Check the electrical connections.
		Too low network voltage.	Measure the voltage to the heat pump's electrical connection.

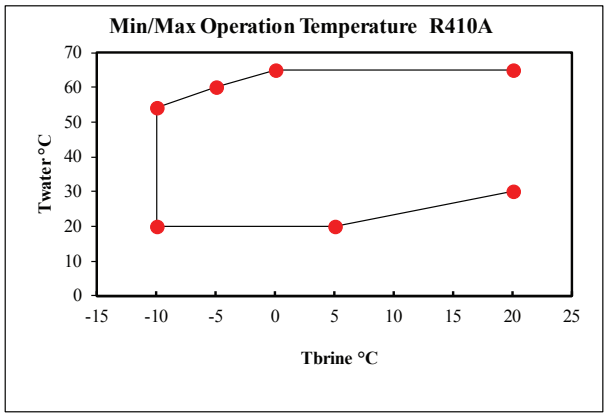
Other alarms;
See separate manual for the control system.

11 Technical data

DHP-R Eco			22	26	33	42
Refrigerant	Type		R410A	R410A	R410A	R410A
	Amount	kg	3.8	3.9	4.5	4.6
	Test pressure	MPa	4.5	4.5	4.5	4.5
	Design pressure	MPa	4.3	4.3	4.3	4.3
Compressor	Type		Scroll	Scroll	Scroll	Scroll
	Oil		POE	POE	POE	POE
Electrical data 3-N	Main supply	Volt	400	400	400	400
	Rated power, compressor	kW	9,91	12,40	14,83	19,12
	Rated power, circulationpumps	kW	0.5	0.5	0.6	0.6
	Start current	A	21.7	23.8	32.2	37.1
	Fuse	A	20	25	32	32
Performance	COP[1]		4.40	4.40	4.37	4.31
	Heating capacity[1]	kW	21.9	25.4	33.5	41.4
	Electrical power[1]	kW	5.0	5.8	7.7	9.6
Nominal flow[2]	Cooling circuit[3]	l/s	1.4	1.5	2.1	2.4
	Heating circuit	l/s	0.5	0.6	0.8	0.9
External available pressure drop[4]	Cooling circuit	kPa	81	75	73	63
	Heating circuit	kPa	75	70	66	50
Internal pressure drop	Condenser	kPa	2.3	6.6	5.0	16.0
	Evaporator	kPa	23.8	27.0	33.0	37.0
Maximum system pressure	Brine	bar	6	6	6	6
	Heat transfer fluid	bar	6	6	6	6
Min/max temperature[5]	Cooling circuit	°C	20/-10	20/-10	20/-10	20/-10
	Heating circuit[6]	°C	65/20	65/20	65/20	65/20
Pressure switches	Low pressure	MPa	0.35	0.35	0.35	0.35
	Operating	MPa	4.0	4.0	4.0	4.0
	High pressure	MPa	4.3	4.3	4.3	4.3
Sound power level[7]		dB (A)	55	55,2	56,4	56
Anti freeze media			Ethanol+water solution -17°C ± 2[8]			
Weight		kg	244	260	281	290

The measurements are performed on a limited number of heat pumps which can cause variations in the results. Tolerances in the measuring methods can also cause variations.

1) B0/W35, According to EN14511 incl. circ.pump.
2) Nominal flow heating circuit Δ10K , cooling circuit Δ3K.
3) Anti-freeze in cooling circuit: Ethanol-water.
4) At nominal flow.
5) Please note that not all cooling circuit temperatures and heating temperatures can be combined.
6) Min. incoming cooling circuit temperature 0°C.
7) Sound power level measured according to EN 12102 and EN ISO 3741 at B0W35
8) Always check local rules and regulations before using antifreeze.



R410A

T brine °C	T water °C
20	65
0	65
-5	60
-10	54
-10	20
5	20
20	30

Danfoss Heat Pumps reserves the right to make changes without further notice. 130923_R_ENG

If these instructions are not followed during installation, operation and maintenance Danfoss Heat Pumps' liability according to the applicable warranty is not binding.

Danfoss Heat Pumps AB • Box 950 • SE-671 29 Arvika
www.danfoss.com